

Appl. No.: 10/604,996
Amdt. dated January 25, 2008
Reply to Office Action of October 25, 2007

REMARKS/ARGUMENTS

Applicants thank Examiner Dao for the courtesies extended to the undersigned during the telephonic interview on January 9, 2008. Applicants have amended Claims 15 and 21 and added Claims 34 and 35. With the entry of the present Amendment, Claims 15-19; 21-25; and 34-35 are pending. Claims 15-19 and 21-25 have been rejected. As discussed during the interview, Applicants request reconsideration of Claims 15-19 and 21-25 in view of the amendments to Claims 15 and 21 and the remarks set forth herein, which Applicants consider to be a summary of the matters discussed during the interview on January 9, 2008.

Claims 34 and 35 Are Added

Claims 34 and 35 have been added. Each of Claims 34 and 35 further recite that “the characteristic impedance of the plurality of lines is lower than the terminating resistor.” Claim 34 depends from Claim 15 and Claim 35 depended from Claim 21. The new claims are supported by the specification of the present Application. For example, the present Application as filed disclosed that the characteristic impedance may be 15 ohms and that the terminating resistor may be 50 ohms. (Paragraph 34). Applicants respectfully request the consideration of these newly added claims.

Summary of Rejections

Each of Claims 15 through 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forster (US Patent No. 7,273,173) in view of Admitted Prior Art (APA) and further in view of Nash (U.S. Patent No. 4,371,876).

According to the Office Action of October 25, 2007, Forster discloses each element of Claim 15 except for ground plane and mismatched terminating resistor. But, according to the Office Action, APA discloses a ground plane and Nash discloses a terminating resistor and it would be obvious to combine these three references.

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Each of Claims 21 through 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forster in view of APA, Nash, and further in view of Petteruti (U.S. Patent No. 6,409,401).

According to the Office Action of October 25, 2007, the combination of Forster, APA, and Nash discloses each element of Claim 21 except for the spacing of the near field concentrations along a predetermined direction being significantly less than a smallest dimension of the transponder in the predetermined direction such that the transponder overlaps and is excited by a plurality of the field component when located in the transponder operating region. But, according to the Office Action, Petteruti discloses such an element and it would be obvious to combine these three references.

The Forster Reference

Forster discloses two or more conductors or transmission lines 26 and 28 spaced apart extending from a reader 14 to a terminating resistor 32. (Col. 4, lines 58-67; Col. 6, lines 1-2). The reader 14 sends out an RF signal along the transmission lines 26 and 28. The RF signals create an RF field along and in proximity to the transmission lines 26 and 28 that can be used to detect the presence of an RFID device 18 along the transmission lines 26 and 28. (Col. 5, lines 30-57). The terminating resistor 32 is configured to match impedance which reduces power reflection back toward the reader. (Col. 6, lines 1-11).

Forster is consistent in that the terminating resistor is configured to match the impedance of the terminating load. By matching the impedance, the electric and magnetic field components are consistent along the length of the transmission lines. Therefore the reader capability to detect the presence on the RFID device is constant along the transmission lines and independent of the liner alignment (or orientation) of the RFID device to the transmission line.

Mismatching the terminating resistor would vary the maximum amplitude of the electric and magnetic field components along the length of the transmission line. In such a system, the reader's capability to detect the presence of the RFID would vary depending on the position of the RFID device along the transmission lines, which would be a significant limitation for Forster considering its intended applications and the relative long transmission lines compared to the

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RFID device.

Forster does not teach any particular length for the transmission lines compared to the RFID device. However, the length of the transmission lines is immaterial because of the matching and the constant strength of the RF field components along the entire length of the transmission lines.

Modifying Forster to have a mismatched terminating resistor would be improper. It would make Forster unsatisfactory for its intended purpose of detecting RFID devices along the entire length of the transmission line. (see MPEP 2143.01 citing *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959) and *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)).

Length of Transmission Line

Each claim has been amended to further clarify that the length of the transmission lines is one half wavelength or multiple thereof. The specification of the present Application supports such an amendment. For example, the specification discloses that “[r]ather than operating as a standing wave radiating antenna, or magnetic field generating coil, the near field coupler 30 according to the invention operates as a one half wavelength unmatched transmission line...” (Paragraph 34).

Forster and the other references do not disclose or suggest such an element. The input impedance of the coupler measured at the input end of a transmission that has a length of one half wavelength, or multiple thereof, is substantially equal to the terminating load regardless of the characteristic impedance of the transmission line. This allows for a mismatch between the transmission line and the terminating resistor while maintaining a match between the reader and the coupler. Therefore, the power loss is minimize between and reader and the coupler. But the impedance value of the transmission line and terminating resistor may be configured to mismatch in order to intentionally create a power loss within the coupler. Unlike traditional transmission line antenna structures, the present invention is intended to create a power loss.

The half-wavelength may also correspond with the length of the transponder. In

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embodiments having a mismatched terminating resistor and a characteristic impedance of the transmission line lower than the terminating resistor, such as claimed in newly added Claims 34 and 35, the electric field components are the strongest at the ends of the transmission line and the magnetic field components are the strongest in the center of the transmission line. A transponder may be linearly aligned with the coupler such that the ends and the center of the transponder matches the ends and the center of the transmission line which also allows the ends of the transponder (which are more sensitive to electric field components) to line up the strongest part of the electric field components and the center of the transponder (which is more sensitive to the magnetic field components).

The Petteruti Reference

Petteruti discloses a printer-encoder that employs RF shielding. (Col. 3, lines 21-25). As explained in the present Application, RF shielding is used to prevent the EM energy from propagating beyond an encoding region. The shielding doesn't limit or change the electric and magnetic field components propagating from a coupler, rather it blocks the field components from escaping beyond the encoding region.

Petteruti does not disclose a "field strength gap" as stated in the Office Action. Petteruti discloses a gap sensor used to locate the gaps between labels so the controller/motor can advance the labels to the encoding and printing station. (Col. 3, lines 60-64)

The Spacing Element of Claims 21-25

Each of Claims 21 -25 includes the following element "spacing of the near field concentrations along a predetermined direction being significantly less than a smallest dimension of the transponder in the predetermined direction such that the transponder overlaps and is excited by a plurality of the field component when located in the transponder operating region."

Petteruti doesn't disclose, teach, or suggest this element. Petteruti does not discuss or suggests a plurality of the field component or the spacing of near field concentrations. Rather Petteruti employs RF shield. An RF shield suggests a single concentration of an RF field that

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would extend beyond the encoding region but for the RF shield.

Stated Reasons to Combine

According to the Office Action, it would be obvious to one skilled in the art to combine the prior art references “in order to keep...mismatch...to a minimum.” This is not a reason to combine the references, if anything it supports the fact that Forster teaches away from mismatching. In traditional antenna designs, one of the objectives is to create an impedance match between the terminating resistor and the transmission line in order to minimize power loss. However, in the claimed embodiments, the inventors want to create a power loss.

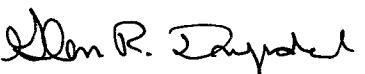
The Rejections Are Overcome

For at least the reasons stated above, it is improper to modify Forster as suggested in the Office Action. Even with the modification, the combination of the references fails to teach each element of the claims. Therefore, each rejection is overcome and should be withdrawn. Applicants respectfully submit that all the pending claims of the Application are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicants’ undersigned attorney to resolve any remaining issues in order to expedite examination of the present Application.

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It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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